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DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Iron and Steel Plants

North Korea

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME				COUNTRY	
Iron and Steel Plants				KN	
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NUMBER	COMIREX NO.	NIETB NO.
See table	See table	See table	See table	See table	See table

MAP REFERENCE

See individual plant references

LATEST IMAGERY USED	NEGATION DATE (If required)
See individual plant references	NA

Item	Installation Name	Coordinates UTM	Coordinates Geographic
1	Chongjin Iron and Steel Plant Kimchaek	52TEB635228	41-45-35N 129-45-24E
2	Kimchaek Iron and Steel Plant Songjin*	52TEA178047	40-41-46N 129-12-43E
3	Pyongyang Steel Plant Kangson*	51SYD230114	38-55-17N 125-35-00E
4	Songnim Iron and Steel Plant Hwanghae	51SYC253914	38-44-30N 125-36-40E

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*NOTE: The installation names given in the data block are from the Basic Encyclopedia. Two are incorrect. The name for Item 2 should be Songjin Steel Plant Kimchaek, and for Item 3 should be Kangson Steel Plant Pyongyang, correctly identifying the town in which the plant is located and the function of the plant. Action has been initiated to have these names changed.

Requirement

COMIREX NO2

Support Number 420120

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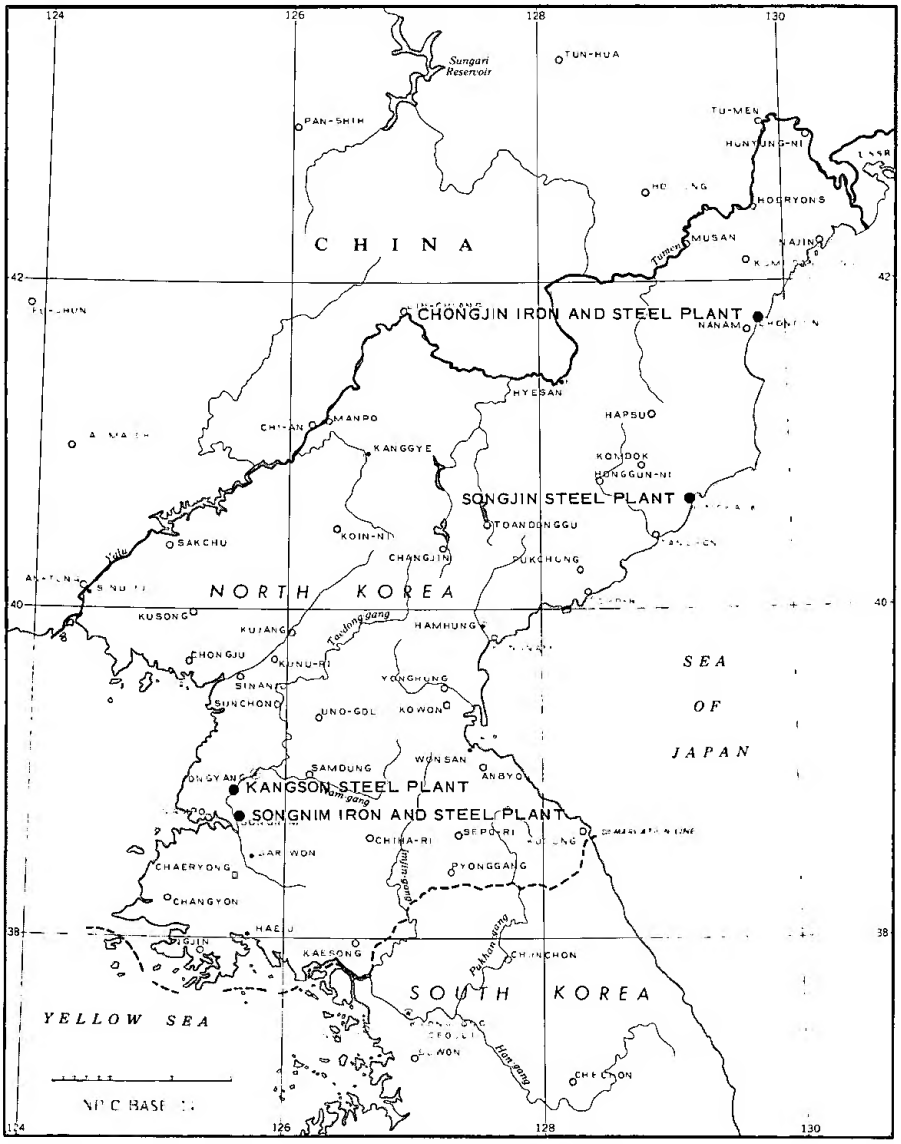

FIGURE 1. LOCATION MAP.

ABSTRACT

This report presents a detailed photographic analysis of the four known iron and steel plants in North Korea. Only one of the four, the Songnim plant, is a fully integrated iron and steel plant with facilities for producing iron, steel, and rolled finished steel products. The plants at Songjin and Kangson produce steel and rolled products but not iron. The plant at Chongjin produces iron and steel but not rolled products. The two plants on the west side of the country, at Kangson and Songnim, therefore appear to have complementary production facilities. The two plants on the east coast, at Chongjin and Songjin, also appear to be interdependent.

The four plants were rebuilt after having been heavily damaged during the Korean War, and they have been steadily expanded and modernized. The rebuilt plants at Kangson and Songnim were first observed on photography in December 1962, the plant at Songjin in May 1963, and the plant at Chongjin in December 1965. They were operating when first observed and on all subsequent photography up through the most recent coverage in the late 1968 - mid 1969 period.

The type and number of facilities involved in steel production vary from plant to plant. On recent coverage the Chongjin plant contained a side-blown converter shop and an air separation plant. The Songjin plant had a probable electric furnace building, an open-hearth furnace facility, an air separation plant, and two rolling mills. The Kangson plant contained one electric furnace building in operation and another externally complete but not operational, an air separation plant, two rolling mills, and a finishing mill. The plant at Songnim had an open-hearth furnace facility and a rolling facility.

The North Korean iron production capacity has increased substantially since 1965 when there were only four blast furnaces in operation and ten under construction at the two iron-producing plants. On recent coverage, Chongjin had five operating blast furnaces and two under construction and Songnim had five operating blast furnaces and four under construction.

This report presents descriptions of the plants and their production activities together with annotated photographs and tables showing major facilities, dimensions, and construction chronology.

INTRODUCTION

The plants at Chongjin and Songjin are on the east coast, on the shore of the Sea of Japan. The other two plants, at Kangson and Songnim, are in the western part of the country, southwest of Pyongyang on the Taedong River (see Figure 1). All four plants are served by road, rail, and water.

Three processes are used in North Korea to produce steel from blast furnace pig iron: side-blown converter, open-hearth, and electric. The electric furnace process is a primary method of producing steel in North Korea, as a result of the availability of electric power and the scarcity of other fuels such as coking quality coal. A high-quality alloy steel is produced by the electric process. The air separation facilities, present at three of the plants, produce oxygen for use in reducing impurities in the steel in all types of furnaces, in order to improve quality and shorten reduction time.

The length and width measurements indicated in the tables when multiplied may not equal the corresponding square feet of roof cover. The area of roof cover was determined by taking into account all protrusions to determine accurately the total square feet.

The approximate sizes and capacities of the blast furnaces were determined by comparing them with similar furnaces of known capacities in China. Blast furnaces are described as small (up to 200 tons a day), medium (200-700 tons a day), and large (700-1,300 tons a day).

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CHONGJIN IRON AND STEEL PLANT KIMCHAEK

BASIC DESCRIPTION

The Chongjin Iron and Steel Plant is in the southern sector of Chongjin, on the shore of the Sea of Japan. It is divided into two sections, both served by road, rail, and water. Each section is partially secured by a wall. One section occupies an area approximately 7,000 by 5,500 feet, and the other is about 3,600 feet square.

The west section of the iron and steel plant contains two by-product coke oven batteries, a coke by-products section, an iron ore sintering plant, a thermal power plant, a side-blown converter shop, an air separation plant, a forge/foundry shop, a forge/foundry complex, two workshops, and numerous support buildings (see Figure 2). The west section also has seven blast furnaces, including two furnaces still under construction.

The east section of the plant contains an iron ore concentration plant, a forge/foundry complex, and a support area (see Figure 3). The concentration plant probably reduces the iron ore to nodules (sponge iron) by the agglomeration process. It consists of one and probably two ore preparation buildings, eight rotary kilns, and a crushing and screening facility.

The absence of steel rolling mills at this plant indicates that the steel ingots are shipped to other plants for rolling into finished steel products.

The plant was rebuilt after the Korean War. A major portion of the facilities were complete and in operation in January 1965 when the rebuilt plant was first observed on photography. Since then, the air separation plant, five blast furnaces, the iron ore sintering plant, and minor additions to several other buildings have been constructed or completed. The chronology of construction is presented in Tables 1 and 2.

A high level of activity was observed at the plant on all photographic missions utilized from January 1965 to June 1969.

REFERENCES

25X1

Map

25X1

US Air Target Chart, Series 200, Sheet 0290-15HL, 3rd edition, August 1964, Scale 1:200,000 (SECRET)

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TABLE 1. DATA ON THE CHONGJIN IRON AND STEEL PLANT, WEST SECTION, JANUARY 1965 – JUNE 1969 (KEYED TO FIGURE 2).

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Item	Description	Dimensions (ft)	Roof Cover (sq ft)	Remarks
1	Side-blown Converter Shop	Irregular	157,475	Additions to end of shop first observed in March 1969 and still under construction in June 1969
2	Forge/Foundry	275 x 135	37,065	
3	Workshops (2)	355 x 95 315 x 120	34,375 33,560	
4	Air Separation Plant Tank	165 x 105 70 diam	16,845	Pipeline leads to side-blown converter shop
5	Materials Shed and Storage Yard	240 x 130	31,200	Ingots stored for shipment
6	Forge/Foundry Complex			
a	Forge/Foundry	185 x 50	9,100	
b	Forge/Foundry	350 x 100	35,000	
c	Forge/Foundry	390 x 70	27,300	
d	Storage Buildings (2)	335 x 40 (ea)	26,800	
7	Coke By-products Section	- -	- -	
8	By-product Coke Oven Batteries (2)	- -		
9	Blast Furnaces (2)	- -	- -	Small; late stage of construction in June 1969
10	Blast Furnaces (3)	- -	- -	Medium
11	Thermal Power Plant	- -	- -	
12	Blast Furnaces (2)	- -	- -	Medium or large
13	Iron Ore Sintering Plant	- -	- -	

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TABLE 2. DATA ON THE CHONGJIN IRON AND STEEL PLANT, EAST SECTION, JANUARY 1965 – JUNE 1969 (KEYED TO FIGURE 3).

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Item	Description	Dimensions (ft)	Roof Cover (sq ft)	Remarks
1	Support Area			
a	Workshop	320 x 125	40,000	
b	Administration Building	160 x 50	160,000	2-Story
c	Workshop	Irregular	26,930	
2	Forge/Foundry Complex			
a	Possible Foundry	135 x 75	10,125	
b	Possible Foundry	200 x 95	19,000	
c	Possible Mold Shop	195 x 65	12,675	
d	Probable Machine Shop	210 x 200	42,000	
e	Workshop	165 x 70	11,550	
f	Workshop	Irregular	15,335	
g	Unidentified Building U/C	- -	- -	Early stage of construction June 1969
h	Forge Shop	195 x 75	14,525	
i	Workshop	195 x 65	12,675	
j	Foundry	240 x 80	19,200	
3	Ore Concentration Plant			
a	Crushing and Screening Facility	- -	- -	
b	Rotary Kilns (8)	- -	- -	
c	Ore Preparation Building	320 x 100	32,000	
d	Probable Ore Preparation Building	425 x 145	61,625	
4	Transformer Substation	- -	- -	4 Transformers

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SONGJIN STEEL PLANT KIMCHAEK

BASIC DESCRIPTION

The Songjin Steel Plant is located on both sides of the Ssangpo River, on the shore of the Sea of Japan, approximately 2.5 nautical miles (nm) north-northeast of Songjin. It is divided into two sections, both served by road, rail, and water. The southern section, which is partially secured by a wall, occupies an area about 4,400 by 1,800 feet. The northern section does not have a secured boundary and is dispersed over an area about 4,800 by 3,700 feet.

The plant contains a probable electric furnace building and an open-hearth building which probably has five open-hearth furnaces. There are also two rolling mills, two blooming/slabbing mills, an air separation plant, a producer gas plant, a large transformer substation, and several foundries, forges, workshops, storage yards, and support buildings (see Figure 4).

The plant was rebuilt after the Korean War. Since the rebuilt plant was first seen on photography in May 1963 the only construction observed has been the completion of the air separation plant (item 13) and a rolling mill (items 16a and b), and an addition to the rolling mill (item 16c). The chronology of construction is presented in Table 3.

A high level of activity was observed at the plant on all photographic missions utilized from May 1963 to June 1969.

REFERENCES

25X1

Map

25X1

US Air Target Chart, Series 200, Sheet M0290-24HI, 4th edition, April 68, Scale 1:200,000 (SECRET/

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TABLE 3. DATA ON THE SONGJIN STEEL PLANT, MAY 1963 – JUNE 1969 (KEYED TO FIGURE 4).

Item	Description	Dimensions (ft)	Roof Cover (sq ft)	Remarks
	Materials Storage Yard	- -	- -	Crane-served yard contains ingots, scrap metal, and rolled items
2	Forges/Foundries (2)	200 x 80 Irregular	6,000 20,450	
3	Foundries (2)	340 x 70 335 x 90	23,800 30,150	
4	Workshop	405 x 100	40,500	First observed under construction in 1963; addition constructed between December 1966 and November 1967
5	Forge Shop	690 x 240	80,955	2 Stacks
6	Producer Gas Plant	- -	- -	
7	Open-Hearth Furnace Building	960 x 70	67,530	Probably 5 furnaces
8	L-shaped Rolling Mill	Irregular	256,255	
9	Blooming/Slabbing Mill	980 x 85	83,300	2 Stacks
10	Probable Electric Furnace Building	885 x 80	59,300	Crane-served raw materials storage yard adjacent to building
	Workshops (2)	305 x 45 (ea)	27,450	
12	Support Area			
a	Transformer Substation	- -	- -	At least 10 transformers
b	Workshop	80 x 80	4,400	
c	Administration Building	Irregular	76,800	
d	Steamplant	- -	- -	
13	Air Separation Plant	140 x 40	9,600	First observed October 1965; 2 adjacent gasholders, 70 feet and 85 feet in diameter
14	Forge/Foundry Complex			
a	Foundry	Irregular	80,455	Under construction May 1963; addition started in March 1968; construction progressing slowly in June 1969
b	Forge Shop	305 x 90	27,450	
c	Forges/Foundries (2)	250 x 55 200 x 55	3,750 2,000	
d	Steamplant	- -	- -	
15	Materials Storage Yard	- -	- -	Served by 5 cranes; yard contains ingots, scrap metal, rolled items, and building materials
16	Rolling/Blooming and Slabbing Mill	Irregular	69,065	
a	Rolling	795 x 90		Under construction May 1963
b	Blooming/Slabbing	305 x 144		Under construction May 1963
c	New Section	400 x 75 230 x 25		First observed March 1968
17	Storage Building	250 x 25		First observed March 1968
18	Unidentified Building U/C	- -		Under construction May 1963, but construction suspended since first observed

KANGSON STEEL PLANT PYONGYANG

BASIC DESCRIPTION

The Kangson Steel Plant is in the southern sector of Kangson, on the west bank of the Taedong River. It is served by road, rail, and water. The plant occupies an area about 6,700 by 4,000 feet and is partially secured by a wall (see Figure 5).

The steel plant contains a producer gas plant, an air separation plant, two electric furnace buildings, two probable foundries, two rolling mills, a finishing mill, a probable galvanizing process building, a workshop, a water treatment facility, two transformer substations, a receiving and shipment building, and numerous storage and support buildings.

The plant was rebuilt after the Korean War. When the rebuilt plant was first seen on photography in December 1962 most of the facilities were completed. The two main facilities constructed later were the probable galvanizing process building (item 4), which was completed by November 1966, and the second electric furnace building (item 18). The furnace building was constructed between November 1968 and August 1969, a relatively rapid rate of construction. The building did not yet appear to be in operation in August 1969. The chronology of construction at the plant is presented in Table 4.

A high level of activity was observed at the plant on all photographic missions utilized from December 1962 to August 1969.

REFERENCES

25X1

Ground Photography

CIA. 354212, 1957-59, 361314, no date; 361316, no date; 473146, 1959 (CONFIDENTIAL)

Maps

USNOO. US Air Target Chart, Series 200, Sheet M0380-7HL, 4th edition, Nov 68, Scale 1:200,000 (SECRET 25X1

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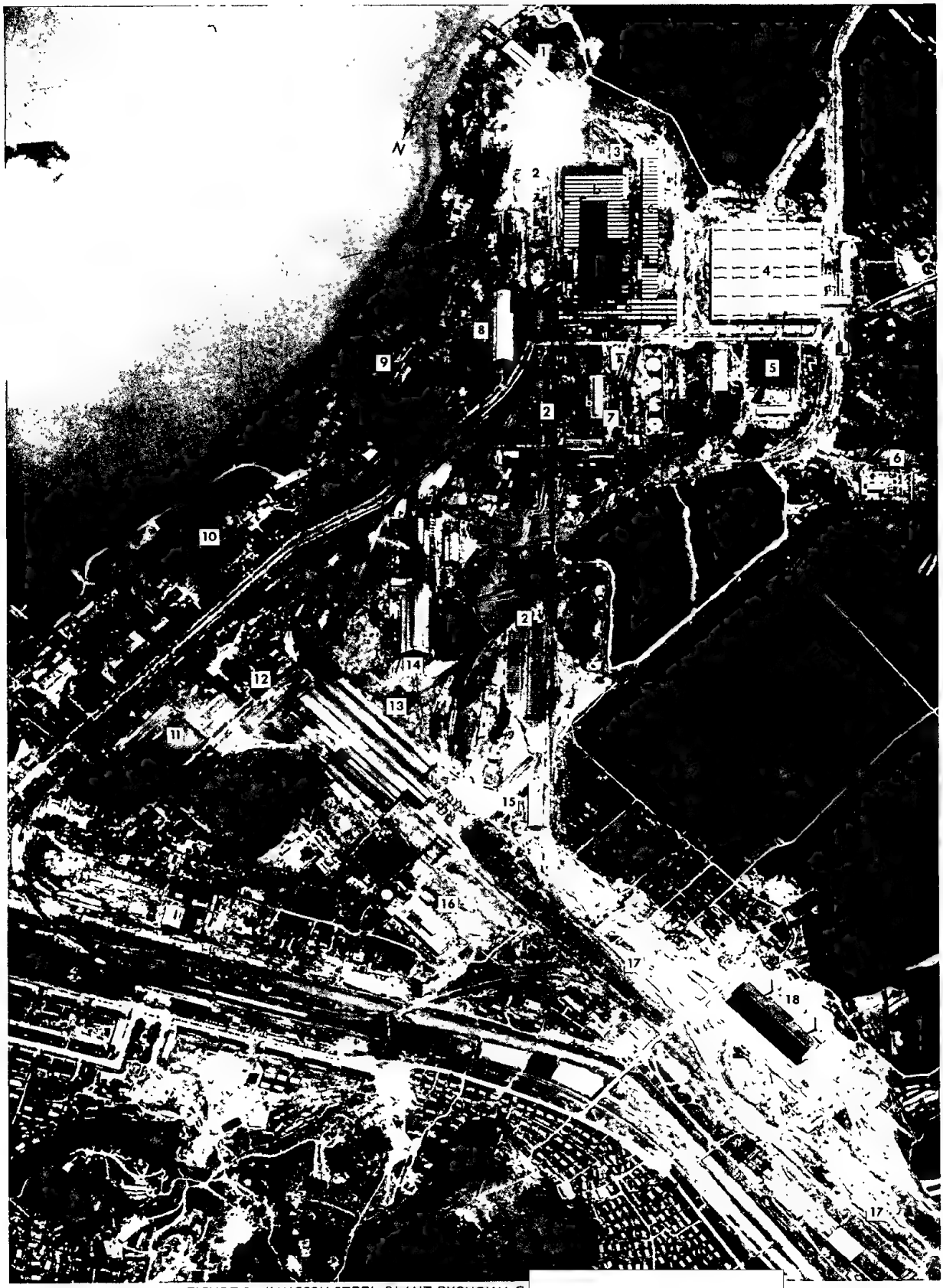

FIGURE 5. KANGSON STEEL PLANT PYONGYANG,

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TABLE 4. DATA ON THE KANGSON STEEL PLANT, DECEMBER 1962 – AUGUST 1969 (KEYED TO FIGURE 5).

Item	Description	Dimensions (ft)	Roof Cover (sq ft)	Remarks
.	Rece'ving and Shipment Bu'lding	430 x 75	33,750	Crane served
2	ngot Storage Yards (3)	- -	- -	Crane served
3	Ro ,ing M'l	,rregu ar	439,365	
a	Ro ing Section	650 x 05		
b	Ro ,ing Section	790 x 330		
c	Ro ing Sect'on	895 x 85		A minor add't'on was completed by January ,968
4	Probab e Galvan'z'ng Process Bu'lding	595 x 585	348,075	
5	Water Treatment Facility			Complete except for second coo - ing tower, on which construction has been suspended
6	Transformer Substat'on	- -	- -	4 Transformers; serves tem 18
7	Rol,'ng Mill	Irregular	84,805	
a	B.oom'ng/Slabbing	300 x 60		
b	Ro ,'ng	385 x 125		
8	Workshop	425 x ,05	45,625	
9	Producer Gas P ant			
10	Transformer Substat'on	- -	- -	Contains at east 2 transformers; serves ,tem 13
11	Fin'sh'ng M' l	,rregu,ar	225,600	
12	Probable Foundry	435 x 80	34,800	
3	Electric Furnace Bu i ding	800 x 305	247,355	Second addit'on under construction August ,969
14	Probable Foundry	8 0 x 40	115,720	2 Stacks
15	Raw Mater'als Storage Bu'.d'ng	260 x 00	30,800	Probab y conta'ns sand
16	Air Separat'on P,ant	345 x 95	30,145	
17	Raw Mater'als Storage Yards (2)			
18	Electric Furnace Bu,d'ng	500 x 20	60,000	Externa y comp ete but not 'n operation in August 1969; in't'a construct'on observed in November ,968

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SONGNIM IRON AND STEEL PLANT HWANGHAE

BASIC DESCRIPTION

The Songnim Iron and Steel Plant is in the western sector of Songnim, on the east bank of the Taedong River. It is served by road, rail, and water. The plant occupies an area about 15,000 by 2,300 feet and is partially secured by a wall (see Figure 6).

The iron and steel plant contains a possible iron ore sintering plant under construction, two fire brick plants, a limestone preparation plant, two by-product coke oven batteries, and a coke by-products section. It contains nine blast furnaces, including five small furnaces (two under construction), two of medium size, and two furnaces under construction which will probably be large. A probable open-hearth furnace building has three and possibly five furnaces. The plant also contains a large rolling mill, a foundry, a workshop, an ingot stripping building, a thermal power plant, and numerous support buildings.

The plant was rebuilt after the Korean War. In December 1962, when the rebuilt plant was first seen on photography, most of the facilities were complete or nearing completion. The only major facilities added have been two of the blast furnaces (item 18) and a possible iron ore sintering plant (item 16). Construction of the two furnaces and the possible sintering plant began between November 1966 and January 1967, and was progressing slowly when the plant was observed in November 1968. The chronology of construction of the plant is presented in Table 5.

A high level of activity was observed at the plant on all photographic missions utilized from December 1962 to November 1968.

REFERENCES

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Map

USNOO. US Air Target Chart, Series 200, Sheet M0380-7HL, 4th edition, Nov 68, Scale 1:200,000 (SECRET/

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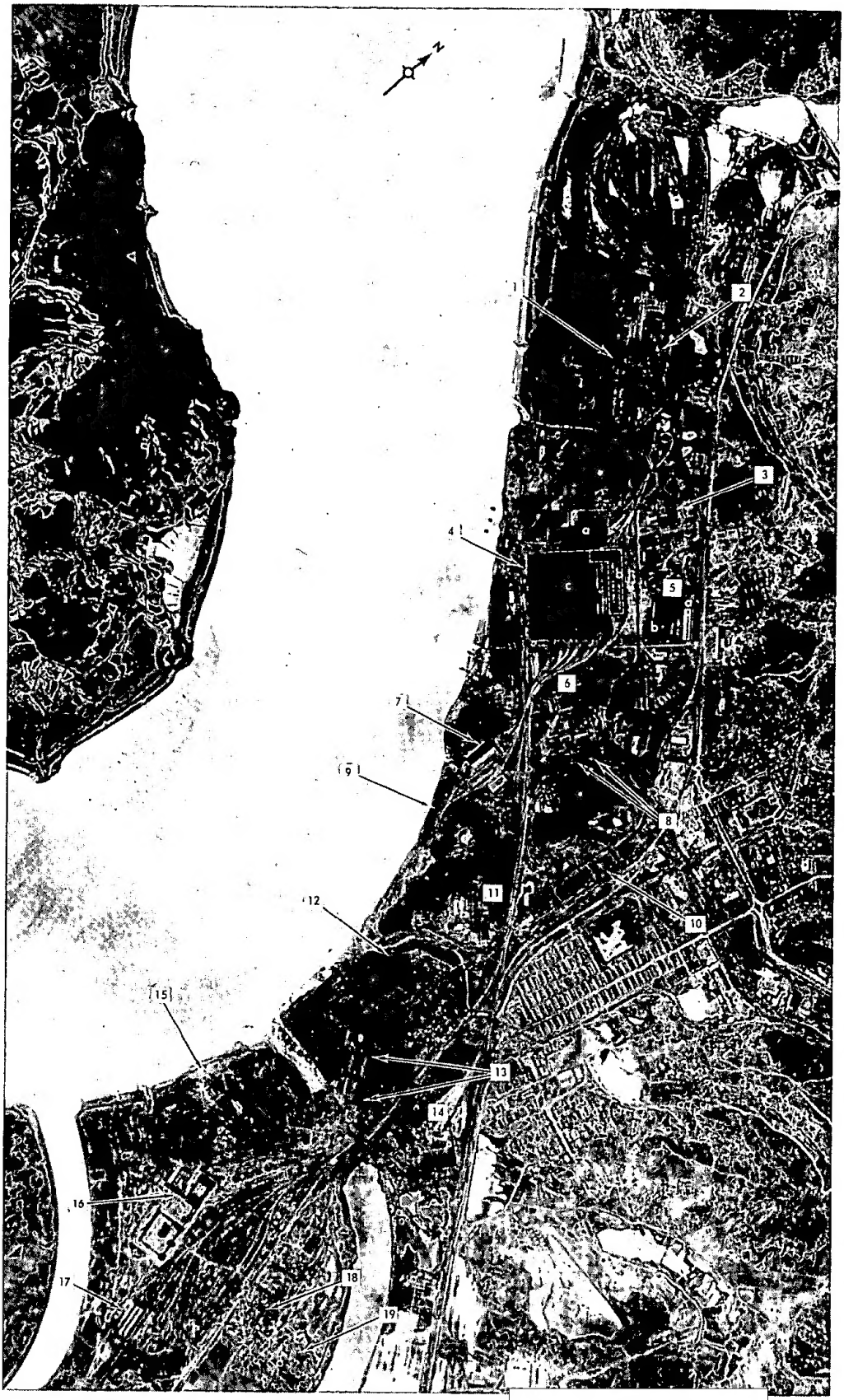

FIGURE 6. SONGNIM IRON AND STEEL PLANT HWANGHAE

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TABLE 5. DATA ON THE SONGNIM IRON AND STEEL PLANT, DECEMBER 1962 – NOVEMBER 1968 (KEYED TO FIGURE 6).

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Item	Description	Dimensions (ft)	Roof Cover (sq ft)		Remarks
1	By-product Coke Oven Batteries (2)	- -	- -		
2	Coke By-products Section	- -	- -		
3	Transformer Substation	- -	- -		4 Transformers
4	Probable Furnace and Rolling Facility	Irregular	923,455		
a	Unidentified Section				
b	Probable Open-Hearth Furnace Section				At least 3 and possibly 5 open-hearth furnaces; 2 cupola furnaces
c	Rolling Section				
5a	Probable Machine Shop	320 x 105	33,600		
b	Probable Foundry	440 x 115	50,600		
6	Thermal Power Plant	- -	- -		4 Transformers
7	Ingot Stripping Building	315 x 210	65,150		
8	Blast Furnaces (2)	- -	- -		Medium size
9	Ingot Storage Yard	- -	- -		Crane served
10	Raw Materials Storage Yard	- -	- -		Crane served
11	Fire Brick Plant	Irregular	63,600		
12	Workshop	350 x 155	54,250		
13	Blast Furnaces (5)	- -	- -		Small; 3 complete and 2 remained under construction in November 1968
14	Fire Brick Plant	Irregular	60,000		
15	Limestone Preparation Plant	- -	- -		
16	Possible Iron Ore Sintering Plant	- -	- -		First observed in January 1967 and still under construction in November 1968
17	Foundry	355 x 150	52,500		
18	Blast Furnaces (2)	- -	- -		First observed in January 1967 and still under construction in November 1968; probably large
19	Transformer Substation	- -	- -		

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